

EAST TEXAS BASIN PROVINCE (048) AND LOUISIANA-MISSISSIPPI SALT BASINS PROVINCE (049)

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INTRODUCTION

Province 48 encompasses the area commonly referred to as East Texas, which is the area of eastern Texas north of the Angelina Flexure, and east of the Ouachita Fold Belt. East Texas comprises Texas Railroad Districts 5 and 6. Province 49 is the area known as the Mississippi-Louisiana Salt Basins, but this area includes southern Arkansas, northern Louisiana, southern Mississippi, southern Alabama, and the Florida Panhandle west of the Apalachicola River. For the 1995 National Assessment, provinces 48 and 49 were combined because many of the plays extended across the rather artificial province boundary between them, which is the State line between Texas and Louisiana. The plays in this section, although designated with 49, include the plays of East Texas.

The boundaries of the combined provinces are (1) the State Federal water boundaries, which are the 3-league (10.36-mile) limit in Florida and the 3-mile limit in Alabama and Mississippi, (2) the Appalachian Front in Alabama, (3) the southern edge of the Black Warrior Basin in Alabama and Mississippi, (4) the Ouachita Front in southern Arkansas and east Texas, and (5) the Lower Cretaceous shelf edge in southern Mississippi and southern Louisiana. The area of the combined provinces is 131,065 square miles.

Significant geologic features of the combined provinces include the Sabine, LaSalle, Monroe, Wiggins-Hancock, Baldwin, and Jackson positive elements, the regional peripheral fault zones, and the numerous salt domes and salt structures that define these provinces. Another unique feature of the combined provinces is the great thickness of the Middle Jurassic Louann Salt, which significantly affected the petroleum geology of the area.

The 1995 assessment includes 47 plays in the combined provinces. Of these, 24 plays are Jurassic or older, 20 are in the Cretaceous, and 3 are in Tertiary rocks. Play definition was done stratigraphically, and most stratigraphic units were considered independently, not in combination with other units.

The level of exploration in the combined provinces can be judged from the number of dry holes (about 80,000), oil wells (about 70,000), and gas wells (about 35,000), for a

conservative total of about 186,000 wells. This exploration has resulted in the discovery of 971 significant oil and gas fields, consisting of 1,477 significant oil and gas reservoirs. Some of the largest fields include Monroe (7.5 TCFG) and East Texas (6,374 MMBO).

The conventional plays identified for this assessment are listed below. The one continuous-type unconventional play, Cotton Valley Blanket Sandstones Gas Play (4923) follows the conventional plays.

CONVENTIONAL PLAYS

- 4901 Piercement Salt Dome Flanks Oil and Gas Play
- 4902 Basement Structures Oil and Gas Play
- 4903 Norphlet Mobile Bay Deep Gas Play
- 4904 Norphlet Wiggins-Hancock Arch Gas Play
- 4905 Norphlet Mississippi Salt Basin Oil and Gas Play
- 4906 Norphlet Alabama Updip Oil Play
- 4907 Norphlet Southeast Margin Jackson Dome Flank Deep Gas Play
- 4908 Norphlet Southern Arkansas-East Texas Oil Play
- 4909 Smackover Wiggins-Baldwin Flanks Gas Play
- 4910 Smackover Alabama/Florida Peripheral Fault Zone Oil and Gas Play
- 4911 Smackover Alabama/Florida Updip Oil Play
- 4912 Smackover Salt Basins Gas and Oil Play
- 4913 Smackover Jackson Dome Deep Gas Play
- 4914 Smackover Jackson Dome Flank CO₂ Play
- 4915 Smackover North Louisiana Gray Sandstone Gas Play
- 4916 Smackover East Texas-Southern Arkansas Fault Zone Oil and Gas Play
- 4917 Smackover East Texas-South Arkansas Updip Oil Play
- 4918 Haynesville Salt Basins Gas and Oil Play

- 4919 Haynesville Updip Alabama/Florida Oil Play
- 4920 Gilmer Limestone Gas Play
- 4921 Cotton Valley Updip Oil Play
- 4922 Cotton Valley Salt Basins Gas Play
- 4924 Cotton Valley Sabine Uplift Gas Play
- 4925 Hosston Updip Oil Play
- 4926 Hosston/Travis Peak Salt Basins Gas Play
- 4927 Travis Peak Sabine Uplift Gas Play
- 4928 Sligo/Pettet Updip Oil Play
- 4929 Sligo/Pettet Salt Basins Gas Play
- 4930 Pettet Southern Sabine Uplift Oil and Gas Play
- 4931 James Limestone Gas Play
- 4932 Glen Rose/Rodessa Updip Oil Play
- 4933 Glen Rose/Rodessa Salt Basins Gas Play
- 4934 Paluxy Updip Oil Play
- 4935 Paluxy Downdip Gas Play
- 4936 Tuscaloosa Peripheral Fault Zone Oil Play
- 4937 Tuscaloosa/Woodbine Structural Oil and Gas Play
- 4938 Tuscaloosa Stratigraphic Oil and Gas Play
- 4939 Woodbine/Tuscaloosa Sabine Flanks Oil Play
- 4940 Eutaw/Tokio Updip Oil Play
- 4941 Eutaw Southern Salt Basins Gas Play
- 4942 Austin Oil Play
- 4943 Selma Salt Basins Oil Play

- 4944 Nacatoch/Navarro Oil and Gas Play
- 4945 Wilcox Salt Basins Oil Play
- 4946 Wilcox Northern Louisiana Salt Basin Gas Play
- 4947 Mobile Bay Miocene Gas Play

UNCONVENTIONAL PLAY

- 4923 Cotton Valley Blanket Sandstones Gas Play

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CONVENTIONAL PLAYS

4901. PIERCEMENT SALT DOME FLANKS OIL AND GAS PLAY

This play is defined by sandstone and carbonate reservoirs that produce oil and gas from the flanks of piercement salt domes in the salt basins. The play boundary is defined by the limits of the piercement salt domes in Alabama, Mississippi, northern Louisiana, and East Texas. Only piercement salt structures are included in this play.

Reservoirs: Reservoirs in this play range from the Upper Jurassic Smackover Formation to the Upper Cretaceous Austin Formation. Many potential reservoirs, both sandstones and carbonates, exist in this play. The porosity in the sandstones ranges up to 30 percent, and the permeability ranges up to 2000 mD. Carbonate porosity ranges up to 28 percent, and permeabilities range up to 1000 mD. Reservoirs along salt dome flanks are typically compartmentalized by intensive faulting. The compartments may or may not be in pressure communication, even within the same reservoir interval. Depths of undiscovered reservoirs range from 4,000 to 16,000 ft.

Source rocks: The source of the oil and gas for the flank reservoirs is not known for certain, but possible source rocks include organic-bearing mudstones of the Upper Jurassic, Lower Cretaceous, and Upper Cretaceous. Migration of the oil and gas was lateral from the source rocks, up faults along the margins of the salt domes, and into the reservoirs.

Traps: Traps in this play are formed by structures produced along the margins of piercement salt domes as the salt moved upward through the sediment column. The salt movement resulted in complex tilting of strata, anticlinal structures, and numerous faults along the flanks and crests of the salt domes. Seals are provided by the salt and by mudstones within the section.

Exploration status and resource potential: This play contains 7 oil reservoirs with a median size of 3.1 MMBO discovered between 1927 and 1967, and 10 gas reservoirs with a median size of 21.5 BCF discovered between 1939 and 1979. The level of exploration in this play is highest in East Texas, and decreases eastward into Mississippi and Alabama. The potential for undiscovered oil and gas in this play is considered moderate to high, and most of the potential is in Louisiana and Mississippi.

4902. BASEMENT STRUCTURES OIL AND GAS PLAY (HYPOTHETICAL)

This hypothetical play is defined by sandstone reservoirs that are estimated to contain oil and gas in basement structures in the northernmost part of East Texas and in southern Arkansas and northern Louisiana. The play coincides with an area that is known to have basement structures; as additional seismic data becomes available, the area of the play may expand eastwards.

Reservoirs: Reservoirs in this play are sandstones of the Eagle Mills Formation, or other sandstones in the Triassic to Middle Jurassic interval. In northernmost East Texas, this interval has been the subject of limited drilling, and some sandstones have had oil shows. The porosity of the sandstones ranges up to 20 percent, and permeabilities are not known. Depths of undiscovered reservoirs range from 4,000 to 10,000 ft.

Source rocks: The source of the oil and gas for this play is not known, but a possible source is Triassic mudstones that reside in grabens formed during the Triassic Gulf rifting phase. Other possible sources in this area include the known Paleozoic rocks that are in some of the basement structures, and Middle Jurassic mudstones.

Traps: Traps in this play are formed by graben and horst structures that developed during the Gulf rifting phase in the Triassic. Both Late Paleozoic and Triassic sediments are involved in the structures. The sandstones are in the grabens, and pinch out against basement faults.

Exploration status and resource potential: This play is hypothetical and probably does not contain producing reservoirs of minimum size. Using a similar Smackover Formation play as an analog (4911), the potential for undiscovered oil and for gas in this play is estimated to be moderate.

4903. NORPHLET MOBILE BAY DEEP GAS PLAY

The Norphlet Mobile Bay Deep Gas Play is defined by Upper Jurassic Norphlet Formation sandstones that produce gas from structural traps in the Mobile Bay region of Alabama State waters and from several blocks in the adjacent Federal waters. Onshore, the northern play boundary is the known limit of large Louann Salt structures on the southern flank of the Wiggins-Hancock Arch, which is also the southern boundary of the Norphlet Wiggins-Hancock Arch Gas Play (4904); the offshore limit is the State-Federal water boundary.

Reservoirs: Reservoirs in this play are eolian dune sandstones of the Upper Jurassic Norphlet Formation. The porosity of the sandstones ranges up to 18 percent, and permeabilities range up to 500 mD. Depths of undiscovered reservoirs range from 17,000 to 24,000 ft.

Source rocks: The source for deep Norphlet gas is generally ascribed to the lower part of Upper Jurassic Smackover Formation, which is an organic-bearing carbonate mudstone. In the Federal waters the lower part of the Norphlet Formation is partly mudstone and may also be a source of gas. Migration was updip and up faults into large salt structures.

Traps: Traps in this play are large, complexly faulted salt structures which are highly compartmentalized by faulting. Seals for the gas in the Norphlet are provided by mudstones of the lower Smackover Formation, by numerous faults in the salt structures, and by a tightly cemented zone in the upper part of the Norphlet Formation.

Exploration status and resource potential: This play contains several large Norphlet reservoirs discovered since 1979, including Bon Secour Bay, Aloe Bay, Lower Mobile Bay/Mary Ann, West Dauphin Island, Northwest Gulf, Fairway, North Central Gulf, Southeast Mobile Bay, and reservoirs in Federal Mobile blocks 821, 823, 827, 861, 862, 864, 867, 868, 904, and 952, and Federal Destin Dome blocks 056 and 111. Data for five of the reservoirs in State waters show a median size of 825 BCFG, with the largest reservoir being 1.1 TCFG. Given the level of exploration in this play, the potential for undiscovered gas resources is estimated to be high.

4904. NORPHLET WIGGINS-HANCOCK ARCH GAS PLAY (HYPOTHETICAL)

This hypothetical Norphlet play is defined by Upper Jurassic Norphlet eolian and fluvial sandstones, which contain gas and condensate in structures along the flanks of the Wiggins-Hancock Arch in southwestern Alabama and southeastern Mississippi. The play is bounded by the margins of the Wiggins-Hancock Arch.

Reservoirs: Reservoirs in this play are eolian and possibly fluvial sandstones of the Norphlet. The Wiggins-Hancock area may have been exposed in Norphlet time, and the sandstones may have formed a fluvial apron around the margins of the arch. Eolian sands may also have been deposited around the margins of the Wiggins Arch. Depths to reservoirs in this play are estimated to range from 13,000 to 21,000 ft.

Source rocks: Source rocks in this play are interpreted to be organic-bearing mudstones of the lower part of the Smackover Formation. The Smackover Formation appears to be

a prolific source rock south of the Wiggins-Hancock Arch, and the hydrocarbons generated at depth are hypothesized to have migrated updip into Norphlet sandstones.

Traps: Traps in this play are structural and are postulated to include both basement structures along the flanks of the uplifts and unconformity traps in which Norphlet sandstones pinch out against the flanks of the arch. Seals are provided by lower Smackover mudstones.

Exploration status and resource potential: This hypothetical play at present does not contain Norphlet producing reservoirs. Using the Smackover Alabama/Florida Updip Oil Play (4911) and the Smackover Wiggins-Baldwin Flanks Gas and Oil Play (4909) as partial analogs, the median size of Norphlet accumulations in this play is estimated to be 20 BCFG. The potential for gas and condensate in this play is estimated to be moderate to high.

4905. NORPHLET MISSISSIPPI SALT BASIN OIL AND GAS PLAY

This play is defined by Upper Jurassic Norphlet Formation eolian sandstone reservoirs that produce oil and gas from salt-related structural traps in the Mississippi Salt Basin. The play is bounded updip by the edge of the regional peripheral fault zone, and downdip by depths to the Norphlet that are estimated to be 25,000 feet. The play extends from the Wiggins-Hancock Arch northwest to the margin of the Jackson Dome.

Reservoirs: Reservoir rocks in this play are eolian dune sandstones of the Norphlet Formation. Eolian sandstones are known to exist in the shallower part of the salt basin, but the downdip extension of the eolian sandstones to the southwest is unknown. Depths to undiscovered reservoirs ranges from 8,000 to 25,000 ft. Porosity ranges up to 20 percent, but the porosity in the deeper part of the play ranges only to 12 percent. One of the limiting factors in the deeper part of the play is reservoir quality. Norphlet sandstones in the salt basin are commonly cemented in part by illite, which does not appear to preserve porosity to the degree it is preserved by chlorite in the deep offshore Norphlet sandstones (see play 4903).

Source rocks: Source rocks for Norphlet hydrocarbons are interpreted to be organic-bearing mudstones of the lower Smackover Formation. The Smackover is well characterized as a source rock in the salt basin. Migration of the hydrocarbons is local, from the lower Smackover along faults into Norphlet sandstones. In the salt basin, all Norphlet production is associated with Smackover production, and where Smackover traps are undercharged, no hydrocarbons are present in the Norphlet.

Traps: Traps in the Norphlet are primarily faulted salt structures and salt anticlines. Seals are provided by mudstones of the lower Smackover Formation.

Exploration status and resource potential: This play contains eight reservoirs, of which seven are oil reservoirs. The reservoirs are Pelahatchie, Nancy, East Nancy, Prairie Branch, Mt. Carmel, Chavers Creek, South Womack Hill, and Flomaton (gas). The median size of the oil reservoirs, which were discovered between 1967 and 1986, is 7.3 MMBO. The gas reservoir at Flomaton contains 114 BCF. The potential for additional oil accumulations in this play is estimated to be moderate, and the potential for deep gas in this play is estimated to be moderate to high, with the caveat that potential reservoir quality problems may exist within the deep Norphlet sandstones in this play.

4906. NORPHLET ALABAMA UPDIP OIL PLAY (HYPOTHETICAL)

This hypothetical Norphlet play was developed to address the potential for hydrocarbons trapped in basement-related structures updip from the regional peripheral fault system in Alabama and Florida. The updip play boundary is the limit of Norphlet sandstones, and the downdip boundary is the peripheral fault system; the play extends from the State-Federal water boundary to central Mississippi updip from the peripheral fault zone.

Source rocks: Source rocks for the hydrocarbons are postulated to be the lower organic-bearing mudstones of the Smackover Formation in the play area. The Smackover is known to be a source in this area; in particular, the lower Smackover is interpreted to be the source of oil for known reservoirs both within the Smackover and in the overlying Upper Jurassic Haynesville Formation.

Reservoirs: Reservoir rocks in this play are Norphlet fluvial and possibly marginal-eolian sandstones. In this area the Norphlet changes facies from eolian to fluvial in an updip direction, and most of the Norphlet Formation in this play is interpreted to consist of fluvial sandstones. Porosity in the fluvial sandstones ranges up to 20 percent, and permeabilities range up to 200 mD, but clays present a possible problem with reservoir quality. Depths to undiscovered reservoirs are postulated to range from 8,000 to 16,000 ft.

Traps: Traps in this play are postulated to be the same as those of the Smackover and the Haynesville in this area, which are small basement-related structures. These structures, including grabens and horsts, influenced deposition of Jurassic sediments.

The Norphlet and the Smackover are not present on the crests, but are present along the flanks of these structures. Hydrocarbons moving from the lower Smackover into the Norphlet sandstones migrated either downward or laterally along faults. Seals for the hydrocarbons are provided by the lower Smackover.

Exploration status and resource potential: There are at present no Norphlet producing reservoirs in this play. Using Smackover production (see play 4911) in this area as an analog for the Norphlet Formation, the median size of Norphlet accumulations is estimated to be approximately 3.5 MMBO. The potential for undiscovered resources in the Norphlet is estimated to be moderate, and the main risk involved in this play is reservoir quality of the Norphlet fluvial sandstones.

4907. NORPHLET SOUTHEAST MARGIN JACKSON DOME FLANK DEEP GAS PLAY (HYPOTHETICAL)

This hypothetical Norphlet play is defined by potential gas production from deep Norphlet sandstone reservoirs along the southeast margin of the Jackson Dome. The play boundaries are not tightly constrained, but are drawn where the Norphlet reaches a depth of approximately 25,000 ft along the southeast margin of the dome.

Reservoirs: Reservoirs in this play are Upper Jurassic Norphlet eolian dune sandstones. Sandstone porosity is estimated to range up to 10 percent, and permeabilities are estimated to range up to 10 mD, which technically means these are tight-gas sandstones. Depths to undiscovered reservoirs range from 20,000 to 25,000 ft.

Source rocks: The source of the gas in the Norphlet is interpreted to be the lower part of the Smackover Formation, where the gas was generated through thermal degradation of the carbonate mudstones during emplacement of the Jackson Dome pluton. The emplacement of the pluton resulted in the generation of hydrocarbon gas and other gas types in the vicinity of the Jackson Dome. The gas contains up to 30 percent H₂S.

Traps: Traps in this play are postulated to have formed along faults generated by deep salt structures. Many salt structures occur in this part of the salt basin. Seals for the hydrocarbons are provided by the faults and by mudstones of the lower Smackover.

Exploration status and resource potential: This play at present does not contain Norphlet producing reservoirs, but, using Smackover production in this area as an analog (see play 4913), the median size of Norphlet accumulations is estimated to be 30

BCFG. The main risk in this play involves Norphlet sandstone reservoir quality, given the depths of the reservoirs and thermal history of the Jackson Dome.

4908. NORPHLET SOUTHERN ARKANSAS-EAST TEXAS OIL PLAY (HYPOTHETICAL)

This hypothetical play is defined by Norphlet or Norphlet-age sandstones that are postulated to contain oil in the northern part of Louisiana and southern Arkansas. The boundaries of the play are the peripheral fault zone in southern Arkansas and northern Louisiana.

Source rocks: Source rocks for this play are postulated to be organic-bearing mudstones of the lower part of the Smackover Formation, but deeper sources, including Triassic mudstones, are also possible. Migration would have been local, and would have been primarily along faults into Norphlet reservoirs.

Reservoirs: Sandstones in the Norphlet would have to be eolian dune sandstones in order to serve as reservoirs in this play, but the probability that eolian dune sandstones are present in the play area is considered to be less than 10 percent. The sandstones of the Norphlet in the play area may be eolian sand-sheet or sand-flat deposits, both of which may not be viable reservoir rocks in the Norphlet Formation.

Traps: Traps in this play are associated with the faults of the graben systems. Seals are postulated as being mudstones of the lower Smackover, and faults.

Exploration status and resource potential: This play at present does not contain Norphlet producing reservoirs. The chance that Norphlet eolian dune sandstones are present in the play area is considered to be less than 10 percent, thus this Norphlet play was not assessed for oil.

4909. SMACKOVER WIGGINS-BALDWIN FLANKS GAS AND OIL PLAY

This play is defined by Upper Jurassic Smackover Formation carbonate reservoirs that produce gas and oil from traps adjacent to the Wiggins-Hancock and Baldwin highs in southwestern Alabama and southern Mississippi. Updip, the play boundaries are defined by the known limits of the uplifts and by the peripheral fault zone in southwest Alabama and Florida; the downdip limit is approximated by the limit of Smackover reservoir rock.

Reservoirs: Reservoirs in this play are oolitic and possible reefal build ups along the flanks of the Wiggins and Baldwin structures. The Smackover thins and in some areas

is absent from the crestal portions of the Wiggins Arch. The crestal area may have been a site of oolitic shoals and reefs which were then covered by mudstones and evaporites of the Haynesville Formation.

Source rocks: The source of the hydrocarbons is interpreted to be organic-bearing carbonate mudstones of the lower Smackover Formation. The Smackover is an excellent source rock in the southern part of this play and the peripheral fault zone plays. The gas and condensate migrated updip into traps along the flanks of the uplifts.

Traps: Some traps occur at pinchouts of Smackover facies against the uplifts, and others are stratigraphic traps in shoal and reef facies around the crests of the uplifts. Seals are provided by overlying fine-grained facies in the Haynesville Formation.

Exploration status and resource potential: This play contains two reservoirs, Chunchula and Cold Creek, both in the Alabama portion of the play. Chunchula is a gas reservoir with a size of 113 BCF discovered in 1974, and Cold Creek is a small oil reservoir with a size of 2.6 MMBO discovered in 1978. The potential for undiscovered resources of gas and condensate in this play is estimated to be high, and low to moderate for oil.

4910. SMACKOVER ALABAMA/FLORIDA PERIPHERAL FAULT ZONE OIL AND GAS PLAY

This play is defined by Upper Jurassic Smackover Formation carbonate reservoirs that produce oil and condensate from structural traps. The play is bounded downdip by the salt basins, and updip by the limits of the regional peripheral fault zones. This play includes the area of the Mobile Graben.

Reservoirs: Reservoirs in this play are grainstones and packstones of the upper part of the Smackover Formation. The porosity of the reservoirs ranges up to 15 percent, and permeabilities range up to 100 mD. Depths to undiscovered reservoirs range from 6,000 to 20,000 ft.

Source rocks: The source for the oil, condensate, and gas in this play is interpreted to be organic-bearing mudstones of the lower part of the Smackover Formation. The Smackover appears to be more prolific as a source rock along the southern parts of the regional peripheral fault zone, south of the Conecuh Ridge. The fields in this part of the fault zone, including Big Escambia and Jay, are far larger than fields in the northern reaches of the fault zone in Alabama and Mississippi. The migration of oil and gas in this play was local, from lower to upper Smackover reservoirs along faults.

Traps: Traps in this play occur along faults within the regional peripheral fault zone. Seals are provided by anhydrites of the overlying Upper Jurassic Buckner Formation.

Exploration status and resource potential: This play contains 19 oil accumulations with a median size of 6.2 MMBO discovered between 1966 and 1982, and 3 gas reservoirs with a median size of 248 BCF discovered between 1954 and 1975. Jay field, discovered in 1972, is one of the largest fields discovered onshore in the United States in the past 25 years. The potential for undiscovered oil and gas in this play is estimated to be moderate to high.

4911. SMACKOVER ALABAMA/FLORIDA UPDIP OIL PLAY

This play is defined by Upper Jurassic Smackover Formation reservoirs that produce oil from structural traps updip from the regional peripheral fault zone in Alabama and Mississippi. The downdip boundary of the play is the peripheral fault zone, and the updip boundary is the limit of the Smackover Formation. The play extends from the State-Federal water boundary in the southeast to central Mississippi.

Reservoirs: Reservoirs in this play are carbonate grainstones and packstones of the upper part of the Smackover. Porosity in the carbonate reservoirs ranges up to 15 percent, and permeability ranges up to 150 mD. Smackover reservoirs in this play have a complex diagenetic history.

Source rocks: The source of oil in this play is interpreted to be organic-bearing carbonate mudstones of the lower part of the Smackover Formation. The migration of the oil was local, from the lower part of the Smackover up faults into the upper Smackover reservoirs.

Traps: Traps in the play are associated with small basement structures in this area updip from the regional peripheral fault zones. Seals are provided by fine-grained rocks of the overlying Haynesville Formation.

Exploration status and resource potential: This play contains eight oil reservoirs with a median size of 3.7 MMBO, and two gas-condensate reservoirs with sizes of 17 and 9 BCF. The oil reservoirs were discovered between 1967 and 1990, and the gas reservoirs were discovered in 1969 and 1976. There are more than 40 oil reservoirs discovered to date in this play, but only 8 are of minimum size. The potential for additional oil reservoirs of minimum size is estimated to be high. The probability of discovering additional gas reservoirs in the central Mississippi area, including such reservoirs as

Tchula Lake and Horseshoe Lake, is considered less than 10 percent, and the play was not assessed for further gas discoveries.

4912. SMACKOVER SALT BASINS GAS AND OIL PLAY

This play is defined by Upper Jurassic Smackover Formation carbonate reservoirs that produce gas and oil from structural traps in the salt basins. The play is bounded updip by the regional peripheral fault zone in Alabama, Mississippi, Arkansas, and East Texas, and downdip by the province boundaries.

Reservoirs: Reservoirs in this play are predominantly upper Smackover grainstone, packstone, and boundstone facies with a complex diagenetic history. The porosity of Smackover reservoirs ranges up to 20 percent, and permeability ranges up to 100 mD.

Source rocks: The source for the oil and gas in this play is organic-bearing mudstones of the lower part of the Smackover Formation. The Smackover is known to be a source rock in the salt basins. The hydrocarbons migrated up faults or updip from the lower to the upper Smackover.

Traps: Traps are structural, occurring in salt structures, anticlines, and faulted salt anticlines. Seals are provided by fine-grained rocks of the overlying Haynesville Formation.

Exploration status and resource potential: This play contains 58 oil reservoirs with a median size of 6.4 MMBO discovered between 1937 and 1990, and 44 gas reservoirs with a median size of 24 BCF discovered between 1944 and 1987. The potential for undiscovered oil and gas resources in this play is considered to be high.

4913. SMACKOVER JACKSON DOME DEEP GAS PLAY

This play is defined by deep Upper Jurassic Smackover sandstone reservoirs that produce gas from structural traps along the southeast flank of the Jackson Dome. The play boundary is limited to sandstones that occur in a narrow zone proximal to the Jackson Dome.

Reservoirs: Reservoirs in this play are interpreted to be sandstones of the Smackover Formation, but the sandstones may be Buckner age, similar to the "Gray Sandstone" of northern Louisiana. Regional studies are needed to further define the stratigraphic position of the sandstones of this play. The porosity of the sandstones ranges up to 12 percent, and permeabilities range up to 4 mD, which indicates that these are tight-gas sandstones. Depths of undiscovered reservoirs range from 20,000 to 23,000 ft.

Source rocks: The source of the gas is interpreted to be organic-bearing mudstones of the lower Smackover Formation. The gas was generated during the thermal event that accompanied the emplacement of the Jackson Dome pluton. The gas migrated from the lower part of the Smackover into the sandstone reservoirs. The gas contains about 30 percent H₂S.

Traps: Traps in this play are structural and have formed along anticlines and deep-seated salt structures. Seals are provided by Upper Jurassic mudstones.

Exploration status and resource potential: This deep gas play contains five reservoirs discovered between 1969 and 1984: specifically, Thomasville, Piney Woods, Piney Woods Southwest, Johns, and Harrisville. The median size of the gas accumulations is 67 BCF, and the largest accumulation is 345 BCF at Thomasville. The potential for undiscovered gas resources in this play, given the limited play area and the level of exploration, is estimated to be moderate.

4914. SMACKOVER JACKSON DOME FLANK CO₂ PLAY

This play is defined by Upper Jurassic Smackover carbonate reservoirs that contain CO₂ gas in traps along the northeast flank of the Jackson Dome in central Mississippi. Although not a hydrocarbon play, this play was included because the reservoirs contain the largest CO₂ accumulations in the U.S., and this gas may be used in the future for enhanced oil recovery operations.

Reservoirs: The carbon dioxide is found in Smackover, Norphlet, and Haynesville reservoirs, but most of the gas is in the Smackover Formation. The Smackover reservoirs are carbonate rocks, whereas the Norphlet and Haynesville are sandstone reservoirs.

Source rocks: The source of the CO₂ is generally interpreted to be the Smackover Formation. The gas was generated during the thermal event accompanying the emplacement of the Jackson Dome pluton. The gas migrated from the lower Smackover to the upper Smackover and traveled a considerable distance updip, at least as far as the peripheral fault zone.

Traps: Traps in this play are structural and occur in anticlines and salt structures along the northeast margin of the Jackson Dome. Seals for the gas are mudstones within the Jurassic section.

Exploration status and resource potential: This play contains six reservoirs, at Goshen Springs, Pisgah, South Pisgah, Leesburg, Gluckstadt, and Hollybush Creek. The availability of CO₂ is important to catalogue, as the gas may be used in enhanced recovery operations.

4915. SMACKOVER NORTH LOUISIANA GRAY SANDSTONE GAS PLAY

This play is defined by "Smackover Gray Sandstone" reservoirs that produce gas condensate from structural-stratigraphic traps in a narrow east-west trend immediately south of the North Louisiana Stateline Graben trend. The "Gray Sandstone" was once considered to be part of the Smackover, but is now considered to be a lowstand fan deposit in the Buckner Formation.

Reservoirs: Reservoirs in this play are sandstones of the Buckner Formation. The reservoirs have been interpreted as turbiditic sandstones deposited in a submarine fan setting downdip from the Smackover shelf edge. The "Gray Sandstones" probably represent a fan deposited during a low sea-level stand. Porosity in the sandstones ranges up to 10 percent, and permeabilities range up to 5 mD. The sandstones are classified as tight sandstones.

Source rocks: The source of the gas condensate may be any of the Upper Jurassic mudstones downdip from this play, most likely the organic-bearing mudstones of the lower part of the Smackover Formation. Migration of the gas was updip from the mudstones into the Buckner sandstones.

Traps: Traps in this play are structural and are related to deep-seated salt structures in this area of the salt basin. Seals are provided by mudstones within the Buckner Formation.

Exploration status and resource potential: This play contains five reservoirs with a median size of 28.5 BCF discovered between 1944 and 1979. The potential for undiscovered gas resources in this play is estimated to be moderate, given our current level of understanding regarding the distribution of these fan sandstones. These sandstones might, however, extend much farther into Mississippi along strike, and possibly as far as the Jackson Dome. If this expanded distribution is correct, the potential for undiscovered gas is estimated to high.

4916. SMACKOVER EAST TEXAS-SOUTHERN ARKANSAS FAULT ZONE OIL AND GAS PLAY

This play is defined by Upper Jurassic Smackover Formation carbonate reservoirs that produce oil and gas from structural traps within the peripheral fault zones in southern Arkansas and East Texas. The play is defined by the limits of the peripheral fault zones, including the Mexia and Talco fault zones in East Texas.

Reservoirs: Reservoirs in this play are Upper Jurassic Smackover Formation grainstones and packstones with complex diagenetic histories. Porosity in the reservoirs ranges up to 25 percent, and permeabilities range up to 150 mD. Depths of undiscovered reservoirs range from 4,000 to 12,000 ft.

Source rocks: The source of the oil and gas in this play is interpreted to be organic-bearing carbonate mudstones of the lower part of the Smackover Formation. In this structural play migration was up faults into Smackover carbonate reservoirs.

Traps: Traps in this play are anticlines, faulted anticlines, and salt structures along the peripheral fault zones. Seals for this play are fine-grained rocks in the overlying Haynesville Formation.

Exploration status and resource potential: This play contains 14 oil reservoirs with a median size of 5 MMBO discovered between 1942 and 1985, and 12 gas reservoirs with a median size of 19.5 BCF discovered between 1955 and 1985. Given the exploration history in this play and the rates of discovery, the potential for undiscovered oil and gas resources is estimated to be moderate.

4917. SMACKOVER EAST TEXAS-SOUTH ARKANSAS UPDIP OIL PLAY

This play is defined by Upper Jurassic Smackover Formation reservoirs that produce oil and gas from traps in the area updip from the regional peripheral fault zones. The play is updip from the fault zones in southern Arkansas and East Texas.

Reservoirs: Reservoirs in this play are grainstones and packstones of the upper part of the Smackover Formation. Porosity ranges up to 10 percent, and permeabilities range up to 10 mD. Depths of undiscovered reservoirs range from 4,000 to 9,000 ft.

Source rocks: The source of the oil and gas in this play is interpreted to be organic-bearing mudstones of the lower part of the Smackover Formation. The oil migrated from the lower part of the Smackover up faults into the reservoirs in the upper part of the Smackover.

Traps: Traps in this play are basement structures and faults updip from the peripheral fault zones. Seals in this play are provided by fine-grained rocks of the overlying Haynesville Formation.

Exploration status and resource potential: This play contains three oil reservoirs with a median size of 2.5 MMBO discovered between 1975 and 1985, and one gas reservoir containing 16 BCF discovered in 1942. The lack of gas discoveries since 1942 indicates that the probability of discovering another gas reservoir of minimum size is less than 10 percent; thus this play was not assessed for gas. The recent series of successes in the Smackover Alabama/Florida Updip Play (4911) suggests that there is considerable potential in this play for small Smackover reservoirs. Thus, the potential for undiscovered oil resources in this play, using play 4911 as an analog, is estimated to be high.

4918. HAYNESVILLE SALT BASINS GAS AND OIL PLAY

This play is defined by Upper Jurassic Haynesville Formation marginal-marine sandstone reservoirs that produce oil and gas from structural traps created by salt movement in the salt basins. The play is bounded updip by the limit of the peripheral fault zones from East Texas to Alabama, and downdip by the depositional extent of Haynesville sandstones.

Reservoirs: Reservoirs in this play are nearshore marine and marginal-marine sandstones of the Upper Jurassic Haynesville Formation. Recent discoveries in the Haynesville updip have prompted a reexamination of the Haynesville sandstones in the salt basins. Some of the Haynesville reservoirs in this play were formerly assigned to the lower part of the Upper Jurassic Cotton Valley Group. Porosity in the sandstones ranges up to 20 percent, and permeabilities range up to 500 mD. Depths to undiscovered reservoirs range from 6,000 to 20,000 ft.

Source rocks: The source of the oil and gas is organic-bearing carbonate mudstones of the lower part of the Smackover Formation. The hydrocarbons migrated up faults from the lower Smackover into Haynesville sandstone reservoirs.

Traps: Traps in this play are anticlines, faulted anticlines, and fault traps created by salt movement, and various types of salt structures in the salt basins of East Texas, northern Louisiana, southern Arkansas, Mississippi, and Alabama. Seals for the reservoirs are provided by mudstones within the Haynesville or the lower part of the Cotton Valley Group.

Exploration status and resource potential: This play contains seven oil reservoirs with a median size of 5 MMBO discovered between 1943 and 1974, and four gas reservoirs with a median size of 21 BCF discovered between 1980 and 1987. The potential for undiscovered oil in this play is estimated to be moderate given the discovery history and level of exploration, whereas the potential for undiscovered gas resources is estimated to be high.

4919. HAYNESVILLE UPDIP ALABAMA/FLORIDA OIL PLAY

This play is defined by Upper Jurassic Haynesville Formation sandstone reservoirs that produce oil from basement-related structural-stratigraphic traps. The play is bounded by the regional peripheral fault zones, and is located updip from the peripheral fault zone in Alabama and the Panhandle of Florida.

Reservoirs: Reservoirs in this play are marginal-marine sandstones of the Haynesville Formation. Locally in Alabama the productive interval is called the "Frisco City sand." Porosity in the sandstones ranges up to 20 percent, and permeabilities range up to 100 mD. Depths of undiscovered reservoirs in the Haynesville range from 6,000 to 14,000 ft.

Source rocks: The source of the oil is organic-bearing carbonate mudstones of the lower part of the Smackover Formation. Geochemically the oil is identical to Smackover oil. It migrated from the lower part of the Smackover up faults into the Haynesville sandstone reservoirs.

Traps: Traps in this play are associated with small basement structures in the updip area. Seals are provided by mudstones of the Haynesville or the lower part of the Cotton Valley Group.

Exploration status and resource potential: This play at present contains one reservoir (in the Frisco City field) with a size of 3.5 MMBO, discovered in 1986. Since the discovery of the Frisco City field, exploration in this play has been intensive, leading to the discovery of oil in Haynesville reservoirs at North Frisco City, West Falco, Hickory Branch, Rome, North Rome, and Megargel fields, although none of these has yet produced 1 MMBO. Given the brief exploration history in this play and the success, the potential for undiscovered oil resources is estimated to be high.

4920. GILMER LIMESTONE GAS PLAY

This play is defined by Upper Jurassic Gilmer Limestone reservoirs that produce gas and oil from structural traps in the salt basins. The play is at present divided into two

productive areas in the East Texas Basin, but the play boundary for this assessment is expanded to encompass much of the East Texas Salt Basin, and the play extends slightly into northern Louisiana. The Gilmer is the basal limestone of the Cotton Valley Group in East Texas, where it is commonly referred to as the "Cotton Valley lime."

Reservoirs: Reservoirs are shelf and reef limestones of the Upper Jurassic Gilmer Limestone. The porosity of the limestone ranges up to 20 percent, and permeabilities range up to 10 mD indicating that these are tight reservoirs. Depths to undiscovered reservoirs range from 10,000 to 18,000 ft.

Source rocks: The source of gas and oil for the Gilmer Limestone is interpreted to be organic-bearing mudstones of the Smackover or possibly downdip mudstones of the Cotton Valley Group. The gas migrated up faults into Gilmer reservoirs. Some Gilmer reservoirs in the eastern part of the East Texas Salt Basin are overpressured.

Traps: Traps in the Gilmer are mainly structural, and these occur on salt structures, faults, and basement related faulted structures. Some stratigraphic traps have formed in reef carbonates situated on the edge of the Gilmer shelf carbonate platform. Seals are provided by the upper part of the Gilmer or by mudstones of the Cotton Valley Group.

Exploration status and resource potential: This play contains 30 gas reservoirs with a median size of 33 BCF discovered between 1965 and 1985, and 2 oil reservoirs with sizes of 6 and 5.7 MMBO discovered in 1959 and 1978. Given the level of exploration in this play and the discovery history, the probability of finding another oil reservoir of minimum size is estimated to be less than 10 percent, and this play was not assessed for oil. The potential for undiscovered gas resources in the Gilmer is estimated to be high.

4921. COTTON VALLEY UPDIP OIL PLAY

This play is defined by sandstone reservoirs of the Cotton Valley Group that produce oil from structural traps along the regional peripheral fault zone in Alabama, Mississippi, north Louisiana, southern Arkansas, and East Texas. The play is defined by the updip limit of the Cotton Valley in the peripheral fault zones, and the downdip limit is placed at the change in hydrocarbon type from oil to gas in the salt basins.

Reservoirs: Reservoirs in this play are fluvial-deltaic and marginal-marine sandstones of the Cotton Valley Group. The porosity of the sandstones ranges up to 20 percent, and permeabilities range up to 200 mD. Depths of undiscovered reservoirs range from 2,000 to 18,000 ft. This play includes reservoirs in conglomerates of the Upper Jurassic Louark Group.

Source rocks: The source of the oil is organic-bearing mudstones of the lower part of the Smackover Formation. Migration is local and is principally up faults from the lower Smackover into Cotton Valley sandstone reservoirs.

Traps: Traps in this play are structural; they occur along faults, anticlines, and faulted anticlines of the regional peripheral fault trends and along salt structures in the northern parts of the salt basins. Seals are provided by mudstones within the Cotton Valley Group.

Exploration status and resource potential: This play contains 38 oil reservoirs with a median size of 2.7 MMBO discovered between 1919 and 1989. Given the discovery history and level of exploration in this play, the potential for undiscovered oil reservoirs in this play is estimated to be low to moderate.

4922. COTTON VALLEY SALT BASINS GAS PLAY

This play is defined by sandstone reservoirs of the Cotton Valley Group that produce gas from structural traps created by salt movement in the salt basins of Mississippi, northern Louisiana, and East Texas. The updip boundary of the play is defined by the change in Cotton Valley production from oil to gas, and the downdip limit is placed at the province boundaries.

Reservoirs: Reservoirs in the Cotton Valley Gas Play are deltaic, shelf, and possibly slope-fan sandstones in the deeper parts of the play. The porosity of the sandstones ranges up to 15 percent, and permeabilities range up to 10 mD, indicating that these are tight gas sandstones. Depths of undiscovered gas reservoirs range from 8,000 to 20,000 ft.

Source rocks: The gas in Cotton Valley reservoirs in the salt basins is derived from organic-bearing mudstones of the Smackover Formation, or possibly from downdip mudstones within the Cotton Valley Group. The gas migrated mainly up faults from the Smackover, or updip from the deeper Cotton Valley mudstones.

Traps: Traps in this play are structural and stratigraphic: the structural traps are in salt structures, anticlines, and faulted anticlines; and the stratigraphic traps occur at facies changes in the slope and fan environments. Seals are provided by mudstones within the Cotton Valley and partly by the low permeability of the sandstones.

Exploration status and resource potential: This play contains 29 gas reservoirs with a median size of 11.6 BCF discovered between 1937 and 1989. Given the exploration

history and discovery history in this play, the potential for undiscovered gas resources in the Cotton Valley Group is estimated to be high. This play extends southwestward in Texas into the Western Gulf Province (047).

4924. COTTON VALLEY SABINE UPLIFT GAS PLAY

This play is defined by sandstone reservoirs of the Cotton Valley Group that produce gas from structural traps along the flanks of the Sabine Uplift. The boundary of the play coincides with the boundary of the Sabine Uplift in East Texas and northern Louisiana.

Reservoirs: Reservoirs in this play are deltaic and nearshore-marine sandstones of the Upper Jurassic Cotton Valley Group. Porosity ranges up to 20 percent, and permeabilities range up to 50 mD, indicating that some of the sandstones in this play are tight-gas sandstones. Depths of undiscovered reservoirs in this play range from 8,000 to 12,000 ft.

Source rocks: The source of the gas is organic-bearing mudstones of the Cotton Valley Group. The gas may have been generated in the deeper Cotton Valley mudstones and migrated updip into traps along the Sabine Uplift.

Traps: Traps in this play are structural, and are associated with faults and basement structures along the Sabine uplift. Some of the trapping may be partly due to the tightness of the sandstones. Seals are provided in part by low-permeability layers within the sandstones, and by mudstones within the Cotton Valley Group.

Exploration status and resource potential: This play contains 19 gas reservoirs with a median size of 51.5 BCF discovered between 1944 and 1982. The level of exploration and the discovery history in this play lead to the estimation that the potential for undiscovered gas resources is low to moderate.

4925. HOSSTON UPDIP OIL PLAY

This play is defined by sandstone reservoirs of the Lower Cretaceous Hosston Formation that produce oil from structural traps. The play is bounded updip by the extent of Hosston sandstones, and downdip by the change in hydrocarbon in the Hosston from oil to gas in the salt basins.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones of the Lower Cretaceous Hosston Formation. Porosity of the sandstones ranges up to 35 percent, and

permeabilities range up to 500 mD. Depths to undiscovered reservoirs ranges from 4,000 to 16,000 ft.

Source rocks: The oil is derived from organic-bearing mudstones of the lower part of the Smackover Formation, and possibly from mudstones of the Cotton Valley Group in the western part of the play. It migrated is up faults from the lower Smackover or the Cotton Valley into Hosston sandstone reservoirs.

Traps: Traps in this play are structural and occur on faults, anticlines, and faulted anticlines of the peripheral fault systems and on salt structures in the northern parts of the salt basins. Seals are provided by mudstones within the Hosston or by evaporites and carbonates of the overlying Lower Cretaceous Sligo and Pettet Formations

Exploration status and resource potential: This play contains 25 oil reservoirs with a median size of 3.3 MMBO discovered between 1930 and 1988. The potential for undiscovered oil resources in this play, given the exploration history and the discovery rate, is estimated to be moderate.

4926. HOSSTON/TRAVIS PEAK SALT BASINS GAS PLAY

This play was defined by Lower Cretaceous Hosston Formation sandstone reservoirs that produce oil from structural traps in the salt basins. The play is bounded updip by the change in Hosston production from gas to oil, and downdip by the province boundaries.

Reservoirs: Reservoirs in this play are deltaic and shelf sandstones of the Lower Cretaceous Hosston Formation. The porosity of the sandstones ranges up to 15 percent, and permeabilities range up to 50 mD. Depths of undiscovered reservoirs range from 4,000 to 18,000 ft.

Source rocks: The source of the gas is interpreted to be organic-bearing mudstones of the Lower Cretaceous in the deeper parts of the salt basins. The gas migrated updip and up faults into Hosston sandstone reservoirs.

Traps: Traps in this play are predominantly structural and occur on salt structures, anticlines, and faulted anticlines. Some minor traps occur at facies changes in the shelf sandstones. Seals are provided by mudstones within the Hosston, and by carbonates and evaporites of the overlying Sligo/Pettet interval.

Exploration status and resource potential: This play contains 62 gas reservoirs with a median size of 39 BCF discovered between 1936 and 1988, and 4 oil reservoirs with a

median size of 8.6 MMBO discovered between 1941 and 1977. The probability of undiscovered oil resources in this play was estimated to be less than 10 percent, and the play was not assessed for oil. The potential for undiscovered gas resources in this play is estimated to be high, given the exploration history and the discovery rate.

4927. TRAVIS PEAK SABINE UPLIFT GAS PLAY

This play is defined by sandstone reservoirs of the Lower Cretaceous Travis Peak Formation that produce gas from structural traps along the flanks of the Sabine Uplift. The play boundary coincides with the boundary of the Sabine Uplift.

Reservoirs: Reservoirs in this play are Lower Cretaceous Travis Peak fluvial and coastal plain sandstones. The porosity of the sandstones ranges up to 20 percent, and permeabilities range up to 150 mD. Depths of undiscovered reservoirs range from 5,000 to 10,000 ft.

Source rocks: The source of the gas is organic-bearing mudstones of the Cotton Valley Group or carbonate mudstones of the Smackover Formation. The gas migrated from the downdip Cotton Valley or Smackover up faults into Travis Peak reservoirs.

Traps: Traps in this play are structural and stratigraphic: the structural traps are on faults and basement structures on the Sabine Uplift, and the stratigraphic traps occur at facies changes within the fluvial systems of the Travis Peak. Seals are provided by mudstones within the Travis Peak, and carbonates of the overlying Lower Cretaceous Pettet interval.

Exploration status and resource potential: This play contains 41 gas reservoirs with a median size of 22.7 BCF discovered between 1937 and 1986, and 3 oil reservoirs with a median size of 1.5 MMBO discovered between 1959 and 1964. The probability of additional oil discoveries is estimated to be less than 10 percent, and this play was not assessed for oil. The potential for undiscovered gas resources, given the discovery rate and exploration history, is estimated to be moderate to high.

4928. SLIGO/PETTET UPDIP OIL PLAY

This play is defined by Sligo sandstone and Pettet carbonate reservoirs that produce oil from structural traps along the regional peripheral fault system in East Texas, northern Louisiana, southern Arkansas, southern Mississippi, and Alabama. The updip boundary of the play is defined by the updip edge of the regional peripheral fault zone

across the provinces; the downdip boundary is the change in hydrocarbon type from oil to gas.

Reservoirs: Reservoirs in this Sligo play are fluvial-deltaic sandstones in the eastern part of the salt basins, and shelf carbonates in the western part of the salt basins area. Porosity in the sandstones ranges up to 30 percent, with permeabilities ranging up to 250 mD. Porosity in the carbonates ranges up to 30 percent, and permeabilities range up to 500 mD. Depths of undiscovered reservoirs ranges from 4,000 to 14,000 ft.

Source rocks: The source of the oil may be organic-bearing Lower Cretaceous mudstones and Upper Jurassic Smackover mudstones. Migration of the oil is primarily up faults into the Sligo/Pettet reservoirs.

Traps: Traps in this play are mainly structural and are on salt structures, anticlines, faulted anticlines, and faults of the peripheral fault zones. Stratigraphic traps occur at facies changes in the carbonates and in the fluvial sandstones. Seals are provided by mudstones of the Lower Cretaceous Hosston and Sligo Formations.

Exploration status and resource potential: This play contains 23 oil reservoirs with a median size of 2.8 MMBO discovered between 1921 and 1988. The potential for undiscovered oil resources in this play, given the exploration history and discovery rate, is estimated to be low to moderate.

4929. SLIGO/PETTET SALT BASINS GAS PLAY

This play was defined by Sligo/Pettet reservoirs that produce gas from structural traps created by salt movement in the southern part of the salt basins. The updip boundary of the play is the change from oil to gas, and the downdip limits are the province boundaries.

Reservoirs: Reservoirs in this play are Sligo sandstones and Pettet carbonates. Sligo reservoirs are deltaic and shelf sandstones in which porosity ranges up to 15 percent, and permeability ranges up to 15 mD. Pettet reservoirs are shelf carbonates and possibly reef carbonates in which porosity ranges up to 20 percent, and permeability ranges up to 100 mD. Depths to undiscovered reservoirs range from 5,000 to 16,000 ft.

Source rocks: The source of the gas in this play is not known for certain, but may be organic-bearing mudstones of the Upper Jurassic and Lower Cretaceous. Migration of the gas was primarily up faults into Sligo/Pettet reservoirs.

Traps: Traps in this play are structural and stratigraphic. The structural traps are on salt structures, anticlines, and faulted anticlines in the salt basins. Stratigraphic traps occur at facies changes in the shelf and reef carbonates. Seals are provided by mudstones in the Pettet, and overlying evaporites in the Glen Rose subgroup.

Exploration status and resource potential: This play contains 34 gas reservoirs with a median size of 17.5 BCF discovered between 1937 and 1985, and 8 oil reservoirs with a median size of 2.2 MMBO discovered between 1936 and 1988. The probability of finding additional oil reservoirs in this play is estimated to be less than 10 percent, and the play was not assessed for oil. The potential for undiscovered gas resources is estimated to be moderate to high, based on the exploration history and the discovery rate for gas.

4930. PETTET SOUTHERN SABINE UPLIFT OIL AND GAS PLAY

This play is defined by Pettet carbonate reservoirs that produce oil and gas from structural traps along the flanks of the southern part of the Sabine Uplift. The boundary of the play is the outline of the Sabine Uplift.

Reservoirs: Reservoirs in this play are Lower Cretaceous Pettet Formation carbonate reservoirs. Porosity in the carbonates ranges up to 20 percent, and permeability ranges up to 200 mD. Depths to undiscovered reservoirs range from 4,000 to 9,000 ft.

Source rocks: The source of the gas and the oil may be organic-bearing mudstones within the Lower Cretaceous, or mudstones of the Upper Jurassic. The oil and gas migrated up faults into Pettet reservoirs.

Traps: Traps in this play are structural and are basement structures, including anticlines and faulted anticlines, and faults associated with the Sabine Uplift. Seals for the oil and gas are provided by mudstones within the Pettet and evaporites in the overlying Glen Rose subgroup.

Exploration status and resource potential: This play contains 31 gas reservoirs with a median size of 17.8 BCF discovered between 1936 and 1983, and 20 oil reservoirs with a median size of 4.6 MMBO discovered between 1938 and 1979. The potential for undiscovered oil resources in this play is estimated to be low, and the potential for undiscovered gas resources, given the level of exploration and discover rate, is estimated to be moderate.

4931. JAMES LIMESTONE GAS PLAY

This play is defined by Lower Cretaceous James Limestone reservoirs that produce gas from structural-stratigraphic traps in the central part of the salt basins. The play extends from the central salt basin of Mississippi through northern Louisiana and into the salt basin of East Texas.

Reservoirs: Reservoirs in the James are shelf and possibly reef carbonates. Porosity in the James ranges up to 15 percent, and permeabilities range up to 10 mD, indicating that the James is a tight gas formation. Depths to undiscovered reservoirs in the James range from 8,000 to 16,000 ft.

Source rocks: The source of the gas is probably organic-bearing mudstones of the Lower Cretaceous or mudstones of the Upper Jurassic. The gas migrated primarily up faults into James carbonate reservoirs.

Traps: Traps in this play are mainly structural and occur in salt structures, anticlines, and faulted anticlines. Stratigraphic traps occur at facies changes in the reef and shelf carbonates. Seals are provided by mudstones and evaporites of the overlying Glen Rose subgroup.

Exploration status and resource potential: This play contains seven gas reservoirs with a median size of 38.4 BCF discovered between 1962 and 1986, and three oil reservoirs with a median size of 3.8 MMBO discovered between 1955 and 1971. The probability of discovering additional oil reservoirs in this play is estimated to be less than 10 percent, and the play was not assessed for oil. The potential for undiscovered gas reservoirs is estimated to be moderate to high in the James Limestone.

4932. GLEN ROSE/RODESSA UPDIP OIL PLAY

This play is defined by Lower Cretaceous Glen Rose and Rodessa reservoirs that produce oil from structural traps in salt structures and peripheral fault zones. The updip boundary of the play is defined by the regional peripheral fault zones from Alabama to East Texas. The downdip boundary of the play is the change in Glen Rose/Rodessa production from oil to gas.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones of the Glen Rose and Rodessa in northern Louisiana, Mississippi, and Alabama. Porosity in the sandstones ranges up to 25 percent, and permeabilities range up to 250 mD. Reservoirs in the Glen Rose in East Texas are shelf limestones that have porosity ranging up to 25 percent, and permeabilities ranging up to 500 mD. Depths of undiscovered reservoirs range from 3,000 to 14,000 ft.

Source rocks: The source of the oil may be organic-bearing mudstones of the Upper Jurassic Smackover Formation. The source of oil in the Glen Rose in East Texas may be mudstones of the Lower Cretaceous. Migration was up faults into the Glen Rose and Rodessa reservoirs.

Traps: Traps in this play are structural and occur in salt structures in the northern parts of the salt basins, and in faults and faulted anticlines in the peripheral fault zones. Seals are provided by mudstones and evaporites within the Lower Cretaceous interval.

Exploration status and resource potential: This play contains 70 oil reservoirs with a median size of 3.7 MMBO discovered between 1930 and 1988. Given the exploration history and the discovery rate, the potential for undiscovered oil resources is estimated to be moderate.

4933. GLEN ROSE/RODESSA SALT BASINS GAS PLAY

This play is defined by Lower Cretaceous Glen Rose and Rodessa reservoirs that produce gas from structural traps in the salt basins. The updip boundary of the play is at the change in production from oil to gas, and the downdip boundary is placed at the province boundaries.

Reservoirs: Reservoirs in this play are deltaic sandstones of the Rodessa in Alabama, Mississippi, and northern Louisiana, and shelf limestones in East Texas. Porosity in the sandstones ranges up to 15 percent, and permeabilities range up to 100 mD. Porosity in the limestones ranges up to 20 percent, and permeabilities range up to 1,000 mD. Depths of undiscovered reservoirs range from 3,000 to 16,000 ft.

Source rocks: The source of the gas may be organic-bearing mudstones of the Lower Cretaceous in the salt basins. Migration was up faults and lateral from the mudstones into the Glen Rose and Rodessa reservoirs.

Traps: Traps in this play are structural and stratigraphic. Structural traps are on salt structures, anticlines, faulted anticlines, and faults. Stratigraphic traps occur at facies changes within the shelf carbonates. Seals are provided by mudstones and evaporites within the Lower Cretaceous interval.

Exploration status and resource potential: This play contains 90 gas reservoirs with a median size of 24 BCF discovered between 1923 and 1988. Given the exploration history and discovery rate in this play, the potential for undiscovered gas resources is estimated to be high.

4934. PALUXY UPDIP OIL PLAY

This play was defined by Lower Cretaceous Paluxy Formation fluvial-deltaic sandstone reservoirs that produce oil from structural traps within the regional peripheral fault trends from Alabama through East Texas. The play is bounded updip by the peripheral fault zones, and downdip by the change from oil to gas production in the Paluxy. This play also includes reservoirs in the Lower Cretaceous Washita-Fredericksburg and Dantzler Formations.

Reservoirs: Reservoirs are fluvial-deltaic sandstones of the Paluxy and the Washita-Fredericksburg. Porosity ranges up to 30 percent, and permeabilities range up to 350 mD. Depths of undiscovered reservoirs in this play range from 3,000 to 13,000 feet.

Source rocks: The source of the oil is interpreted to be organic-bearing mudstones of the Upper Jurassic Smackover Formation. The oil migrated up faults and into the Paluxy and associated reservoirs.

Traps: Traps in this play are structural, and are on faults, anticlines, and faulted anticlines of the fault zones and salt structures of the northern parts of the salt basins. Seals are provided by mudstones within the Paluxy and Washita-Fredericksburg interval.

Exploration status and resource potential: This play contains 73 oil reservoirs with a median size of 3 MMBO discovered between 1913 and 1987. Given the exploration history and discovery rate in this play, the potential for undiscovered oil reservoirs is estimated to be moderate.

4935. PALUXY DOWNDIP GAS PLAY

This play is defined by Lower Cretaceous Paluxy Formation sandstone reservoirs that produce gas from structural traps in the downdip areas of the salt basins. The updip limit of the play is the change from oil to gas production in the Paluxy, and the downdip limits are the province boundaries. This play also includes the Lower Cretaceous Washita-Fredericksburg and Dantzler sandstone reservoirs.

Reservoirs: Reservoirs are fluvial-deltaic sandstones of the Paluxy, Washita-Fredericksburg, and Dantzler formations. Porosity ranges up to 25 percent, and permeabilities range up to 1,000 mD. Depths of undiscovered reservoirs ranges from 4,000 to 16,000 ft.

Source rocks: The source of the gas in the Paluxy, Washita-Fredericksburg, and Dantzler may be organic-bearing mudstones of the Lower Cretaceous. The gas migrated up faults into the sandstone reservoirs.

Traps: Traps in this play are structural and occur on faults, anticlines, and salt structures in the southern parts of the salt basins. Seals are provided by Lower Cretaceous mudstones.

Exploration status and resource potential: This play contains 29 gas reservoirs with a median size of 24.7 BCF discovered between 1939 and 1981. Given the exploration history and the discovery rate, the potential for undiscovered gas resources in this play is estimated to be moderate.

4936. TUSCALOOSA PERIPHERAL FAULT ZONE OIL PLAY

This play is defined by Upper Cretaceous Tuscaloosa Group sandstone reservoirs that produce oil from structural traps in the northern part of the salt basins. The play boundary is defined by the regional peripheral faults from Alabama through East Texas.

Reservoirs: Reservoirs are fluvial-deltaic sandstones of the Upper Cretaceous Tuscaloosa Group. Porosity ranges up to 30 percent, and permeabilities range up to 500 mD. Depths of undiscovered reservoirs range from 2,000 to 8,000 ft.

Source rocks: The source of the oil in the updip Tuscaloosa is generally interpreted to be organic-bearing mudstones of the Tuscaloosa, but in the fault zones a Smackover source cannot be ruled out. Migration was along faults into Tuscaloosa reservoir sandstones.

Traps: Traps in this play are structural and occur on faults, anticlines, and faulted anticlines in the regional peripheral fault zones. Seals are provided by mudstones of the Tuscaloosa Group.

Exploration status and resource potential: This play contains 18 oil reservoirs with a median size of 8.1 MMBO discovered between 1921 and 1989. Given the exploration history and discovery rate, the potential for undiscovered oil reservoirs in this play is estimated to be low.

4937. TUSCALOOSA/WOODBINE STRUCTURAL OIL AND GAS PLAY

This play is defined by Upper Cretaceous Tuscaloosa Group and Woodbine Formation sandstone reservoirs that produce oil and gas from structural-stratigraphic traps in the salt basins. The play is present throughout the salt basins except where bisected by the Tuscaloosa Stratigraphic Oil and Gas Play (4938).

Reservoirs: Reservoirs in this play are Tuscaloosa and Woodbine Formation fluvial-deltaic sandstones. Porosity in these sandstones ranges up to 30 percent, and permeability ranges up to 500 mD. Depths of undiscovered reservoirs range from 4,000 to 14,000 ft.

Source rocks: The source for the oil and gas in this play is interpreted to be organic-bearing mudstones of the Upper Cretaceous Eagleford Formation. Migration of the oil and gas was mainly local, and was updip into Tuscaloosa and Woodbine sandstones.

Traps: Traps in this play are structural and stratigraphic. Structural traps are in salt structures, anticlines, and faulted anticlines, and stratigraphic traps, which have a structural component, occur at facies changes across structural elements. Seals are provided by mudstones within the Tuscaloosa Group.

Exploration status and resource potential: This play contains 71 oil reservoirs with a median size of 5.2 MMBO discovered between 1929 and 1986, and 25 gas reservoirs with a median size of 40 BCF discovered between 1933 and 1975. Given the exploration history and discovery rate in this play, the potential for undiscovered oil reservoirs is estimated to be moderate, and the potential for undiscovered gas is estimated to be low.

4938. TUSCALOOSA STRATIGRAPHIC OIL AND GAS PLAY

This play is defined by Tuscaloosa fluvial channel sandstone reservoirs that produce oil and gas from stratigraphic traps in the central part of the Mississippi Salt Basin. The play boundary is defined by the extent of the stratigraphic traps, which are flanked by structural traps that also contain Tuscaloosa oil (see play 4937). The stratigraphic play is approximated by the area between the Louisiana Salt Basin and the Mississippi Salt Basin where there are no piercement salt domes. This play extends southward to the Lower Cretaceous shelf edge.

Reservoirs: Reservoirs in the Tuscaloosa are fluvial sandstones, mainly of the meandering fluvial type. Porosity in the sandstones ranges up to 30 percent, and

permeability ranges up to 600 mD. Depths of undiscovered reservoirs ranges from 4,000 to 14,000 ft.

Source rocks: The source of the oil and gas in this play is interpreted to be organic-bearing mudstones of the Tuscaloosa Group. The oil and gas migrated laterally and updip into the Tuscaloosa sandstones.

Traps: Traps are predominantly stratigraphic, where fluvial channel sandstones are encased in floodplain mudstones, and a southwest structural dip traps the oil in point-bar sandstones. Seals are provided by mudstones of the Tuscaloosa Group.

Exploration status and resource potential: This play contains 21 oil reservoirs with a median size of 4.8 MMBO discovered between 1943 and 1989, and 9 gas reservoirs with a median size of 12 BCF discovered between 1926 and 1987. Given the exploration history and the discovery rate in this play, the potential for undiscovered oil resources is estimated to be high, and the potential for undiscovered gas is estimated to be low.

4939. WOODBINE/TUSCALOOSA SABINE FLANKS OIL PLAY

This play is defined by Woodbine and Tuscaloosa sandstones that produce oil from structural traps along the extreme flanks of the Sabine Uplift. The Woodbine and Tuscaloosa sandstones are not present on the crest of the uplift. The play is bounded by the presence of Woodbine and Tuscaloosa sandstones along the flanks of the Sabine Uplift.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones of the Woodbine and Tuscaloosa. Porosity ranges up to 30 percent, and permeabilities range up to 1500 mD. Depths of undiscovered reservoirs range from 4,000 to 10,000 ft.

Source rocks: The source of the oil is generally interpreted to be organic-bearing mudstones of the Eagleford Formation, downdip from the Woodbine and Tuscaloosa reservoirs. Given the thermal maturation of the Eagleford in East Texas, other older sources may be required to account for the oil. The oil migrated updip into the sandstones.

Traps: Traps in this play are predominantly stratigraphic, in that the sandstones were beveled against the flanks of the uplift, and the oil migrated into the sands and was pooled against the unconformity. Seals are provided by fine-grained carbonates of the Upper Cretaceous Austin Formation.

Exploration status and resource potential: This play contains 10 oil reservoirs with a median size of 2.5 MMBO discovered between 1914 and 1970. The giant East Texas field is included in this play. Given the exploration history and the discovery rate, the probability of finding another oil reservoir of minimum size is estimated to be less than 10 percent, and the play was not assessed for oil.

4940. EUTAW/TOKIO UPDIP OIL PLAY

This play is defined by Upper Cretaceous Eutaw and Tokio Formation sandstone reservoirs that produce oil from structural traps in the northern part of the salt basins. The updip limit of the play is defined by the outer edges of the peripheral fault zones, and the downdip limit is placed at the change from oil to gas production in the salt basins.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones in the Upper Cretaceous Eutaw and Tokio Formations. Porosity ranges up to 35 percent, and permeabilities range up to 500 mD. Depths to undiscovered reservoirs range from 2,000 to 8,000 ft.

Source rocks: The source of the oil in Eutaw and Tokio reservoirs is not known for certain, but a possible source for the oil in this part of the salt basin is the Smackover Formation. The oil is postulated to have migrated up faults into the Eutaw and Tokio sandstones.

Traps: Traps in this play are structural and occur along faults, anticlines, faulted anticlines, and salt structures of the northern part of the salt basins and the regional peripheral fault trends. Seals are provided by Upper Cretaceous mudstones.

Exploration status and resource potential: This play contains 37 oil reservoirs with a median size of 5.8 MMBO discovered between 1904 and 1980. Given the exploration history and discovery rate in this play, the probability for additional oil discoveries of minimum size is estimated to be less than 10 percent, and the play was not assessed for oil.

4941. EUTAW SOUTHERN SALT BASINS GAS PLAY

This play is defined by Upper Cretaceous Eutaw and Tokio Formation sandstone reservoirs that produce gas from structural traps in the southern part of the salt basins. The updip boundary of the play is defined by the change from gas to oil, and the downdip limit is placed at the province boundary.

Reservoirs: Reservoirs in this play are shelf sandstones of the Upper Cretaceous Eutaw and Tokio Formations. Porosity in the sandstones ranges up to 32 percent, and permeabilities range up to 500 mD. Depths to undiscovered reservoirs range from 4,000 to 10,000 ft.

Source rocks: The source of gas in the Eutaw is not known for certain, but a possible source is Lower or Upper Cretaceous organic-bearing mudstones. The gas migrated up faults into the Eutaw and Tokio sandstones.

Traps: Traps in this play are structural and occur on anticlines, faulted anticlines, and salt structures in the southern part of the salt basins. Seals are provided by Upper Cretaceous mudstones.

Exploration status and resource potential: This play contains nine gas reservoirs with a median size of 132 BCF discovered between 1916 and 1988. Considering that Eutaw gas may have been bypassed in several fields in the salt basins, the potential for undiscovered gas resources in this play is estimated to be high.

4942. AUSTIN OIL PLAY

This play is defined by Upper Cretaceous Austin Formation chalk reservoirs that produce oil from structural traps in the East Texas salt basin. The play extends across East Texas and slightly into northern Louisiana, where the interval changes to clastic deposits of the Eutaw and Tokio Formations.

Reservoirs: Reservoirs in this play are porous chalk of the Upper Cretaceous Austin Formation. The chalk in this play, unlike the chalk to the south in the Western Gulf Province, is not intensely fractured, but the oil resides in primary intergranular porosity ranging from 15 to 35 percent. Permeabilities are low (up to 2 mD), however, indicating that artificial fracturing is required for the chalk to be productive. Depths of undiscovered reservoirs range from 2,000 to 6,000 ft.

Source rocks: The oil in this play is interpreted to be from the same source as the oil in the Woodbine in this area (see play 4937) which is mudstone of the Eagleford Formation. The oil migrated up faults into the chalk reservoirs.

Traps: Traps in this play are on the faulted salt structures in the East Texas Salt Basin. Intense faulting of the salt structures has created many isolated segments of reservoirs. Seals are provided by mudstones juxtaposed along faults.

Exploration status and resource potential: This play contains one Austin reservoir with a size of 2 MMBO discovered in 1929 in Van field, Van Zandt County, Texas. Given the level of exploration in this play, the potential for undiscovered oil in the Austin is estimated to be moderate.

4943. SELMA SALT BASINS OIL PLAY

This play is defined by Upper Cretaceous Selma Group and Annona Formation chalk reservoirs that produce oil from structural traps in the salt basins and regional peripheral fault zones. The play includes the peripheral fault zones and the part of the salt basin where the Selma contains oil. The play extends into East Texas along the Sabine Uplift. This play also includes reservoirs in the Upper Cretaceous Ozan Formation of southern Arkansas and in the Upper Cretaceous Annona and Saratoga Formations in East Texas.

Reservoirs: Reservoirs in this play are chinks of the Selma and Annona, with porosities ranging up to 25 percent and permeabilities ranging up to 5 mD. Ozan reservoirs are shelf sandstones in southern Arkansas with porosities ranging up to 30 percent, and permeabilities ranging up to 500 mD. Depths of undiscovered reservoirs range from 1,000 to 6,000 ft.

Source rocks: The source of oil in the Selma and the Ozan in the northern part of the salt basins is not known for certain, but may be organic-bearing mudstones of the Smackover Formation. The source of oil in the Annona and Saratoga reservoirs is not known, but may be mudstones of the Eagleford Formation. The oil migrated up faults into the Selma, Ozan, and Annona reservoirs.

Traps: Traps in this play are predominantly structural and are anticlines, faulted anticlines, and faults associated with the regional peripheral fault zones and salt structures in the salt basins. Seals are provided by Upper Cretaceous mudstones.

Exploration status and resource potential: This play contains 21 oil reservoirs with a median size of 4.4 MMBO discovered between 1905 and 1980. Given the level of exploration and the discovery rate in the Selma, the probability of finding another Selma oil reservoir of minimum size is estimated to be less than 10 percent, and the play was not assessed for oil.

4944. NACATOCH/NAVARRO OIL AND GAS PLAY

This play is defined by Upper Cretaceous-Paleocene sandstones and "gas rock" lithologies that produce oil and gas from structural traps in the salt basins area. This play is bounded updip by the regional peripheral fault zones and downdip by the province boundaries.

Reservoirs: Reservoirs are primarily deltaic and shelf sandstones in this play, with porosities ranging up to 35 percent and permeabilities ranging up to 2000 mD. This play also includes the carbonate reservoir at Monroe field, with porosities ranging up to 25 percent, and permeabilities ranging up to 200 mD.

Source rocks: The source of the gas is not known for certain, but the source of the oil in the updip part of the play may be mudstones of the Smackover Formation. The gas may have come from Upper Cretaceous mudstones, but some of the gas may also have had a Smackover source. The oil and gas migrated up faults into the Nacatoch and Navarro reservoirs.

Traps: Traps in this play are structural and occur on faults, anticlines, faulted anticlines, basement structures, and salt structures. Seals are provided by Upper Cretaceous and Paleocene mudstones.

Exploration status and resource potential: This play contains 25 oil reservoirs with a median size of 9.5 MMBO discovered between 1895 and 1956. Given the lack of discoveries in this interval since 1956 and the level of exploration, the probability of discovering another reservoir of minimum size is estimated to be less than 10 percent, and the play was not assessed for oil. The play contains five gas reservoir with a median size of 119 BCF discovered between 1912 and 1930. The median size of gas reservoirs is skewed by the inclusion of the Monroe field, with a size of 7.5 TCF. The probability of discovering another gas reservoir of minimum size in this play was estimated to be less than 10 percent, and the play was not assessed for gas.

4945. WILCOX SALT BASINS OIL PLAY

This play is defined by Paleocene-Eocene Wilcox Group sandstone reservoirs that produce oil from structural-stratigraphic traps in the southern part of the Mississippi Salt Basin. The play extends from southern Mississippi into northern Louisiana, and narrows into the southern part of East Texas. The Wilcox is an aquifer in northernmost East Texas and southern Arkansas.

Reservoirs: Reservoirs in this play are Paleocene-Eocene Wilcox Group fluvial-deltaic sandstones. Fluvial-deltaic sandstone reservoirs of the Frio and Sparta Formations were also included in this play. The porosity of the sandstones ranges up to 38 percent, and permeabilities range up to 1500 mD. Depths of undiscovered reservoirs range from 1,000 to 9,000 ft.

Source rocks: The source of the oil is generally considered to be mudstones within the Wilcox, but additional sources may include Lower Cretaceous mudstones. Any migration of oil from the Lower Cretaceous would have proceeded up faults into the Wilcox sandstone reservoirs, whereas migration from the Wilcox was local, and lateral into Wilcox sandstones.

Traps: Traps in this play are structural and stratigraphic, in that the reservoirs are located on subtle structures such as anticlines. The Wilcox fluvial system gives rise to many stratigraphic traps where sandstones are encased by mudstones. Seals in this play are provided by Wilcox mudstones.

Exploration status and resource potential: This play contains 171 oil reservoirs with a median size of 3.4 MMBO discovered between 1925 and 1987, and 3 gas reservoirs with a median size of 37 BCF discovered between 1952 and 1988. Given the level of exploration and the discovery rate, the potential for undiscovered oil resources is estimated to be moderate. The probability for additional gas reservoirs is estimated to be less than 10 percent, and the play was not assessed for gas.

4946. WILCOX NORTHERN LOUISIANA SALT BASIN GAS PLAY

This play is defined by Paleocene-Eocene Wilcox sandstone reservoirs that produce gas from structural-stratigraphic traps along the southern margin of the Monroe Uplift. The play is limited in extent to an area southwest of the Monroe Uplift.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones of the Wilcox Group. Porosity of the sandstones ranges up to 35 percent, and permeabilities range up to 1500 mD. Depths to undiscovered reservoirs range from 1,500 to 4,000 ft.

Source rocks: The source of the gas is postulated to be organic-bearing mudstones of the lower part of the Smackover Formation. The gas migrated up regional faults and entered Wilcox sandstone reservoirs.

Traps: Traps in this play are structural and stratigraphic in that the sandstones were deposited across subtle structures such as anticlines related to regional fault systems. Seals are provided by mudstones within the Wilcox Group.

Exploration status and resource potential: This play contains 10 gas reservoirs with a median size of 12 BCF discovered between 1928 and 1980. Given the level of exploration and the discovery rate of gas in this play, the potential for undiscovered gas reservoirs is estimated to be low.

4947. MOBILE BAY MIOCENE GAS PLAY

This play is defined by Miocene sandstone reservoirs that produce gas from structural-stratigraphic traps. The onshore part of this play is defined by the known limit of Miocene sandstones, and the offshore limit is the State-Federal waters boundary. This play coincides with a Miocene offshore play defined by the Minerals Management Service.

Reservoirs: Reservoirs in this play are Miocene deltaic and shelf sandstones known locally as the Amos, Luce, Escambia, and Meyer. The sandstones thicken to the southwest towards the offshore. Porosity ranges up to 38 percent and permeabilities range up to 2500 mD.

Source rocks: The hydrocarbon source is mudstones within the Miocene section, and the gas is known to be biogenic. The gas migrated locally, from mudstones into the reservoir sandstones. Depths of undiscovered sandstone reservoirs range from 1,000 to 3,500 ft, with the deeper reservoirs located in State waters.

Traps: Traps are mainly stratigraphic, occurring where porous sandstones pinch out into enclosing mudstones, although the sandstone distribution is largely controlled by subtle regional structures. In the deeper part of the play in State waters, the traps occur on the large faulted salt structures. Seals are provided by the enclosing Miocene mudstones.

Exploration status and resource potential: This play contains two reservoirs (West Foley and Foley) with sizes of 8.6 and 9 BCF discovered in 1979 and 1981. It also contains 34 other reservoirs less than minimum size. Given the level of exploration and discovered rate in this play, the potential for undiscovered gas resources is estimated to be moderate to high.

UNCONVENTIONAL PLAY

Continuous-Type Play

4923. COTTON VALLEY BLANKET SANDSTONES GAS PLAY

This continuous-type unconventional play is defined by sandstones of the Cotton Valley Group that produce gas from a narrow east-west trend south of the North Louisiana Stateline Graben System. The play boundary is defined by published depositional limits of the blanket sandstones.

Reservoirs: Reservoirs in this play are fluvial-deltaic sandstones of the Upper Jurassic Cotton Valley Group, including the sandstones known locally as the Bodcaw, Vaughan, Taylor, Davis, and Sexton. The porosity of the sandstones ranges up to 20 percent, and permeabilities range up to 250 mD. Depths of undiscovered reservoirs in this play range from 7,000 to 12,000 ft.

Source rocks: The gas is derived from organic-bearing mudstones of the lower part of the Smackover Formation and/or from mudstones within the Upper Jurassic Cotton Valley Group. The gas migrated up faults from the Smackover or updip from deeper mudstones of the Cotton Valley.

Traps: Traps in this play are structural and occur in salt structures, anticlines, and faulted anticlines. Seals are provided by mudstones within the Cotton Valley.

Exploration status and resource potential: This play contains 25 gas reservoirs with a median size of 77.8 BCF discovered between 1936 and 1977. Given the exploration history and level of exploration in this play, the potential for undiscovered gas resources is estimated to be moderate.

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